

REMARKS

Drawings

As requested, proposed changes to the drawings have been submitted for approval to obviate the objections thereto. Please defer the submission of the formal corrected drawings pending an indication of allowable subject matter.

Specification

Correction of Fig. 7 of the drawings by adding a prime (') to reference numeral 26 has been proposed. This would make the drawings consistent with line 18 of page 6 of the written description which refers to the "flange portion 26' ". Applicant believes that the text is correct and that Fig. 7 of the drawings should be corrected to comport therewith. Accordingly, approval of correction of the drawings and reconsideration and withdrawal of the objection to the written description is requested.

§112 Rejections

To obviate the various §112 rejections and other informalities in the claims, original claims 1-20 have been cancelled and a new set of claims 21-31 added. The new set of claims is believed to obviate the noted informalities and all of the §112 rejections.

The Rejection

All of the original claims were rejected only under §103 in view of various combinations of references. Claims 1-3 were rejected over Pryce in view of Blumenthal and claim 4 was rejected in view of these two references plus Ring. Claims 5 and 6 were rejected in view of these three references plus Korner. Claims 7-10 and 17 were rejected over Pryce in view of Itameri-Kinter and claims 11-16 and 18-20 were rejected over these two references plus Ring.

Pryce U.S. Patent 5,669,763

Pryce discloses in Figure 8 an electrical connector 12 for a fuel pump module 6 which has a plurality of conductive pins 32 molded in a plastic housing 16 press fitted in an opening 13 in a metal flange 2 with a sealing gasket 50 received between the housing and the flange 2.

Blumenthal U.S. Patent 5,683,108

Blumenthal discloses an automotive air bag inflation vessel 30 of a metal such as aluminum with an aluminum plug or closure 50 threaded therein which, as best shown in Fig. 4, has electrical connector pins 126 sealed by a body of an insulating material such as glass 134 to a tapered metal collar 100 press fit into the aluminum closure 50 to provide a seal between them.

Ring U.S. Patent 3,898,731

Ring discloses an electrical connector with a metal conductive pin 2 received in ceramic sleeves 16 and 14 carried by a jacket 22 of a corrosion resistant metal such as stainless steel. A glass annulus 12 provides a seal between the pin and the jacket.

Korner U.S. Patent 3,825,669

Korner discloses an electrical connector for a nuclear reaction vessel which must withstand high pressure and temperature ambient conditions. The connector has a header 12 of stainless steel penetrated by stainless steel or copper sheaths 38 welded thereto in which electrical conductors 34 are received in spaced-apart relation and in a densified refractory insulating material 36 such as alumina or magnesia received in an outer sheath 38.

Itameri-Kinter U.S. Patent 4,964,789

Itameri-Kinter discloses a hermetic compressor 10 with an electrical connector 42 having a metal cup-shaped body 48 welded to the compressor housing. Electrical connector assemblies 56 each have a pair of spaced-apart pin segments 60 and 62 interconnected by a fusible link 64 and received in an electrically insulating sleeve 68 of an alumina ceramic material. A portion of the sleeve 68 and the pin segment 62 are sealed in an opening 54 of the cup body by an annular glass seal 76. The glass does not engage the pin segment 60 so that if the fuse link 64 melts or vaporizes, it produces an increased pressure in the sleeve cavity 70 thereby cracking the sleeve and separating the pin segment 60 to provide a visual indication that the fuse link has melted.

Claim 21

New independent claim 21 defines a sealed electrical fitting for a vehicle fuel tank comprising a metal wall of a fuel tank having at least one opening with a circumferentially continuous edge, at least two elongated electrically conductive metal pins extending through the opening and each having a diameter and a longitudinal length greater than the diameter, at least one seal of glass received in the opening and bonded to at least one of the pins, and adjacent surfaces of adjacent pins being spaced apart a distance equal to or greater than the pin diameter, the minimum spacing between the peripheral edge of the glass seal and an immediate adjacent pin being at least equal to the pin diameter, the coefficient of thermal expansion of the metal wall being greater than that of the glass, and the metal wall and glass seal being configured so that the glass is in a compressed state.

This specific construction, arrangement and spacing of the pins relative to each other, the peripheral edge of the glass seal, and the configuration and coefficients of thermal expansion of the metal wall and the glass of the seal produce the significant practical advantages of elimination of fuel vapor permeation through the electrical fitting, a permeation barrier capable of withstanding the significant environmental and operational temperature fluctuations and aging and an electrical fitting in which the hermetic glass seal is rugged, durable, of economical manufacture and in service has a long useful life.

Claim 21 is Patentable

The specific construction and arrangement defined by new claim 21 is not disclosed, suggested, taught or made obvious to skilled persons by any of the cited references whether considered alone or in the proposed combinations.

None of these references, whether considered alone or in combination, disclose, suggest or teach to skilled persons the specific construction having the specified spacing of the pins with respect to each other and the spacing between the peripheral edge of the glass seal and hence the metal opening and each immediately adjacent pin in combination with a coefficient of thermal expansion of the metal wall being greater than that of the glass and the metal wall and the glass seal being configured so that the glass is in a compressed state. Whether considered alone or in combination, none of the applied references disclose, suggest or teach any spacing at all between adjacent pins or between a pin and the adjacent peripheral edge of the glass and hence the metal wall nor that the coefficient of thermal expansion of the metal wall be greater than that of the glass of the seal. Since none of the drawings of any of these references are to scale, they cannot be relied upon as a suggestion or teaching to skilled persons of any of the required spacings of the pins or the peripheral edge of the glass seal or of the thermal expansion of the metal relative to the glass of the seal.

Furthermore, these references do not disclose, suggest or teach to skilled persons which of their numerous elements should be discarded and which selected, rearranged and recombined with elements not disclosed in the prior art to achieve applicant's specific construction as defined by new claim 21 and its significant practical advantages. For

these same reasons, these references do not contain any suggestion or motivation that they should be combined and even if they are combined they simply do not teach the subject matter as a whole as defined by new claim 21.

Accordingly, new claim 21 defines patentable subject matter and should be allowed.

Claims 22-31

Each of claims 22-31 is ultimately dependent on new claim 21 and hence defines patentable subject matter for the foregoing reasons.

Furthermore, each of dependent claims 22, 24, and 27-29 define additional dimensional relationships of the glass seal relative to the diameter of the pin which are not disclosed, suggested or taught to skilled persons by the cited references whether considered alone or in combination and hence each of these dependent claims also defines patentable subject matter for at least these additional reasons.

Boesch

Neither *In re Boesch* nor the other cited cases are applicable in the present situation because the prior art references, whether considered alone or in combination, do not disclose, suggest or teach to skilled persons applicant's basic concept and construction requiring specific pin spacing and glass seal dimensional limitations as well as specified configurations and rates of thermal expansion to achieve a workable construction so that all that remains for skilled persons is optimization thereof. Unlike the present situation, in

Boesch and the other cited cases, the specific combination of elements and workable ranges were already disclosed and taught by the references to skilled persons along with the effect produced by changes in the ranges so that all that remained was optimization of the values within the disclosed workable ranges. Consequently, neither *Boesch* nor the other cited cases are controlling or applicable in the present situation.

Conclusion

For the foregoing reasons, each of new claims 21-31 is believed to be directed to and define novel and patentable subject matter and to comply with the requirements of §112. Accordingly, reconsideration and allowance of this application as amended is respectfully requested.

If, after considering this Response, the Examiner believes any of the claims are not allowable, a telephone interview is requested with applicant's undersigned attorney William Francis so that immediate consideration can be given to any further amendments suggested by the Examiner or otherwise needed to place all the claims in a condition for allowance. The Examiner is asked to initiate this interview by telephoning William Francis at 248-689-3500 who normally can be reached between 8:00 A.M. and 5:00 P.M. Monday through Friday.

A Marked-Up Copy Showing Changes Made in the Response to the Office

Action is enclosed.

We believe no additional claim fees are required; however, if the Patent Office determines that there are claim fees due, it is hereby authorized and respectfully requested that any additional fees be charged to our Deposit Account No. 50-0852.

Respectfully submitted,

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Learman & McCulloch, P.C.

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By 

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513AM

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: **Daniel A. Gilmour**
Serial No. 09/765,252
Filed: January 18, 2002
For: Automotive Fuel Tank Electrical Fitting
Group Art Unit: 2831
Examiner: Jinhee J. Lee
In reply to: Examiner's Letter of May 8, 2002

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TECHNOLOGY CENTER 2800

CERTIFICATE OF MAILING

Date of Deposit with U.S. Postal Service August 1, 2002. I hereby certify that this paper is being deposited with the United States Postal Service as first class mail under 37 CFR 1.8 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

Shirley A. Langley
Shirley A. Langley

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

**MARKED-UP COPY SHOWING CHANGES MADE
IN RESPONSE TO OFFICE ACTION**

This is in response to the first Office Action of May 8, 2002 which rejected most of the claims for indefiniteness under the second paragraph of §112 and rejected all the claims under §103 in view of various combinations of the applied prior art references.

Please AMEND this application as follows:

A

IN THE DRAWINGS

Please approve the corrections to the drawings shown in red ink on the enclosed copy as follows

:

FIG. 1 - addition of reference numeral 29 and a lead line

FIG. 5 - the extension of the lead line for the reference numeral 42; and

FIG. 7 - the addition of a prime (') to the reference numeral 26.

Please defer the submission of formal corrected drawings pending an indication of allowable subject matter.

IN THE CLAIMS

Please CANCEL, without prejudice, claims 1-20.

Please ADD the following new claims 21-31:

21. (New)

- 1 A sealed electrical fitting for a vehicle fuel tank comprising:
- 2 a metal wall of the fuel tank having at least one opening through the wall with
- 3 a circumferentially continuous edge;
- 4 at least two elongate electrically conductive metal pins extending through the
- 5 opening(s) and each having a diameter and a longitudinal length greater than the diameter;
- 6 at least one seal of glass received in the opening(s) and bonded to at least one
- 7 of the pins;

8 adjacent surfaces of adjacent pins being spaced apart a distance equal to or
9 greater than the diameter of the pin, the minimum spacing between a peripheral edge of the
10 glass seal and each immediately adjacent pin being at least equal to the diameter of the pin,
11 the coefficient of thermal expansion of the metal wall being greater than the coefficient of
12 thermal expansion of the glass of the glass seal(s), and the metal wall and the glass seal(s)
13 being configured so that the glass is in a compressed state.

22. (New)

1 The electrical fitting of claim 21 wherein the circumferential edge of the
2 opening(s) has an axial length at least equal to the diameter of the pin and the glass seal(s)
3 has an axial length at least equal to the diameter of the pin.

23. (New)

1 The electrical fitting of claim 21 wherein the same glass seal is bonded to at
2 least two of the pins and the edge of the same opening through the metal wall.

24. (New)

1 The electrical fitting of claim 21 wherein the wall of the fuel tank comprises
2 a metal flange, a tubular housing fixed to the flange, extending through the flange, and
3 defining the opening through the wall, all of the pins are received in the housing and the glass
4 seal is bonded to all of the pins and the housing.

25. (New)

1 The electrical fitting of claim 24 wherein the axial length of the glass seal is
2 substantially equal to the diameter of the pin.

26. (New)

1 The electrical fitting of claim 21 wherein the metal wall comprises a metal
2 flange, at least two metal collars carried by the flange and each defining one of the through
3 openings having an inner circumferentially continuous edge, each collar has one of the pins
4 extending therethrough and one of the glass seals is bonded to each of the pins and the inner
5 edge of the collar in which the pin is received.

27. (New)

1 The electrical fitting of claim 26 wherein the inner edge of each collar has an
2 axial length at least equal to the diameter of the pin received therein and the axial length of
3 the seal received in the collar is at least equal to the diameter of its associated pin.

28. (New)

1 The electrical fitting of claim 26 wherein each seal is an annular ring with an
2 outside diameter of at least two and one-half times the diameter of its associated pin.

29. (New)

1 The electrical fitting of claim 28 wherein the spacing between immediately
2 adjacent seals is at least equal to the outside diameter of the pins.

30. (New)

1 The electrical fitting of claim 26 wherein the collars are homogeneously
2 integral with the flange.

31. (New)

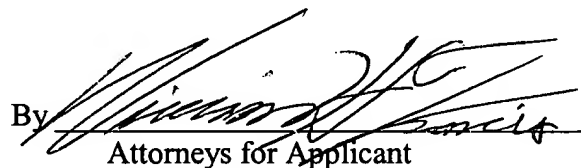
1 The electrical fitting of claim 26 wherein the walls also comprises a metal tray
2 having a circumferentially continuous outer peripheral edge, the collars are homogeneously
3 integral with the tray, the flange has another through opening defined by a circumferentially
4 continuous edge which bears on the outer peripheral edge of the tray and these mating edges
5 are fixed and sealed together by one of welding, soldering and brazing.

Respectfully submitted,

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Approved *[Signature]* 9/30/02

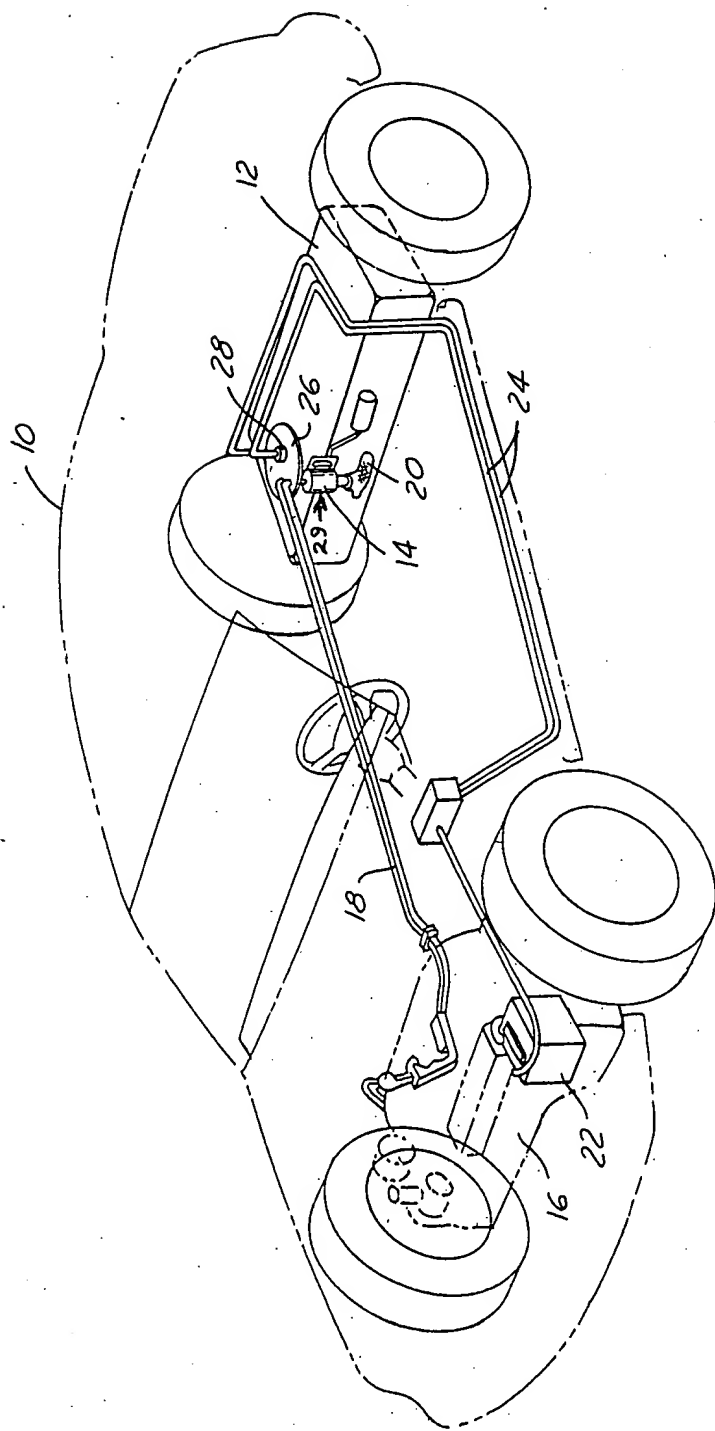


FIG. 1

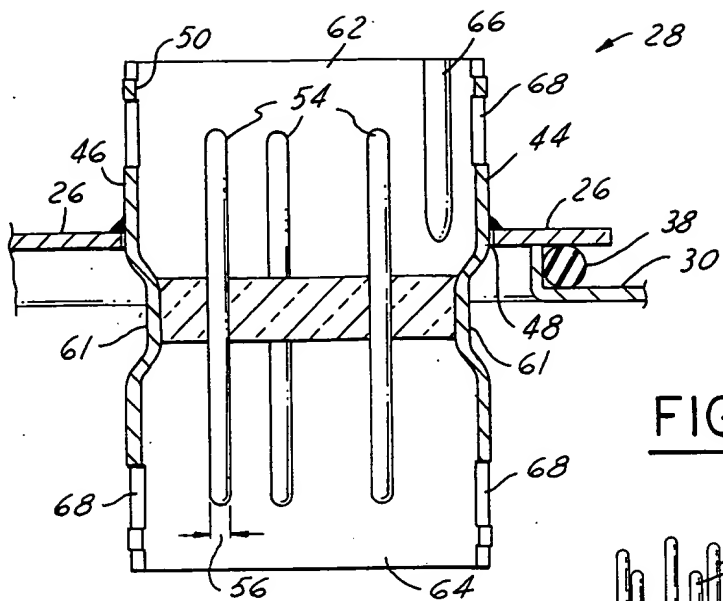


FIG. 4

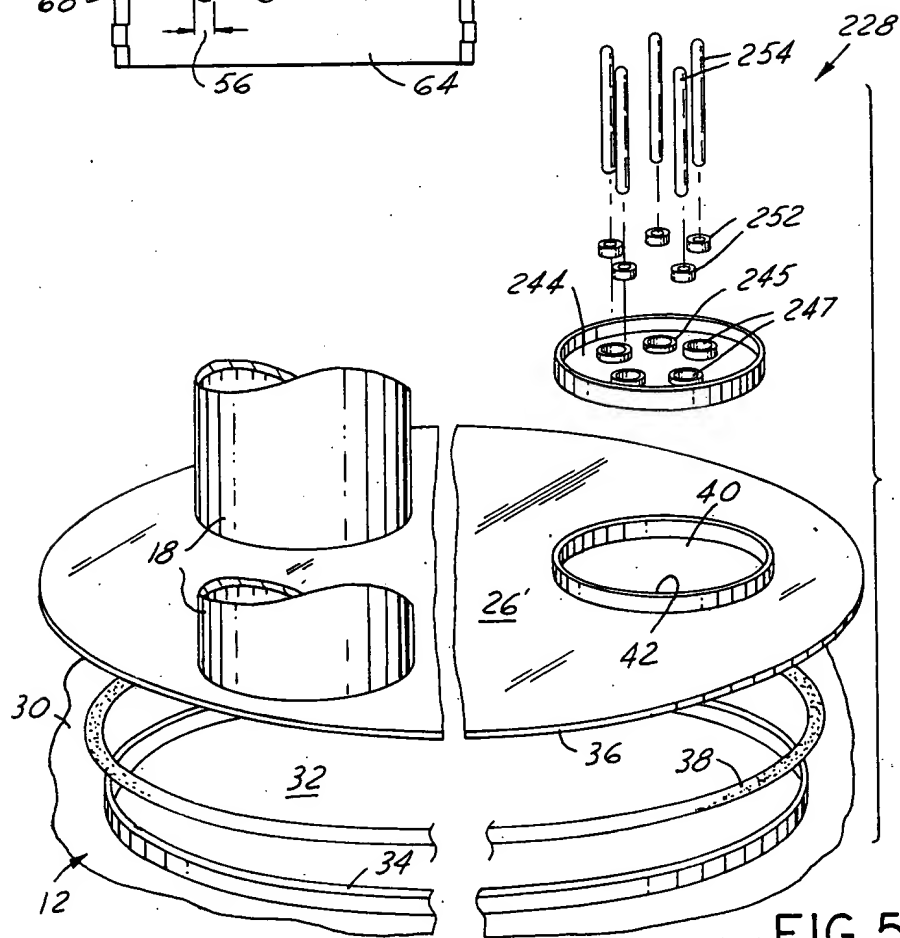


FIG. 5

Approved *[Signature]* 9/20/02

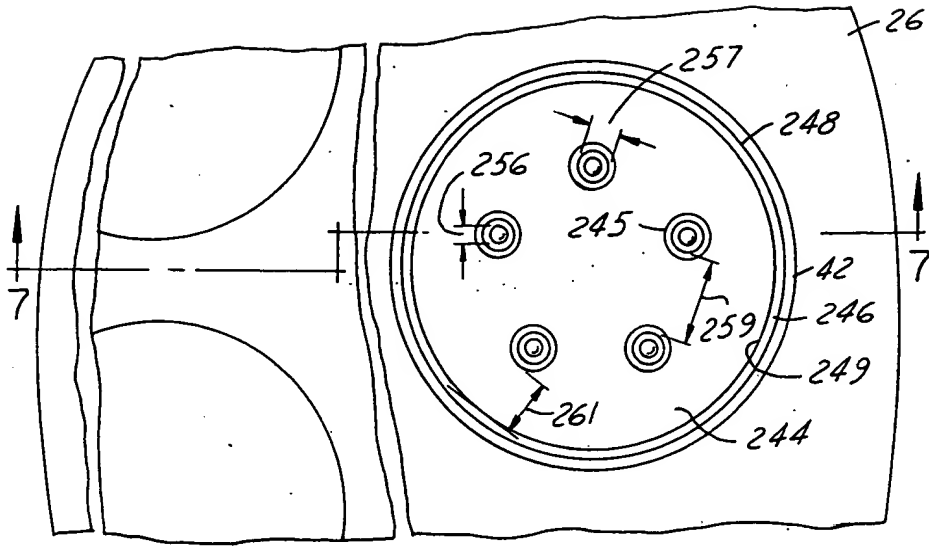


FIG. 6

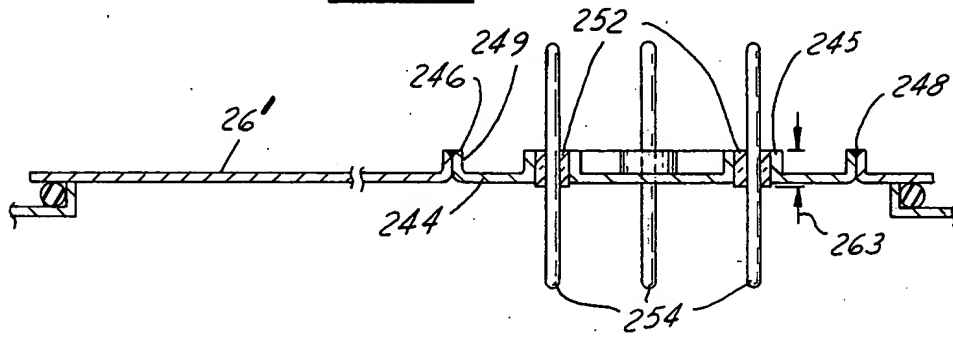


FIG. 7

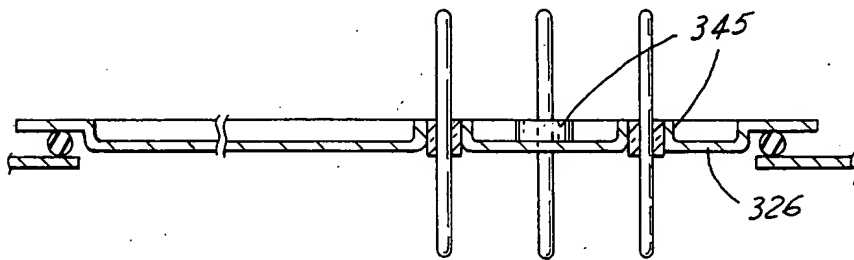


FIG. 8

Approved *[Signature]* 9/29/02